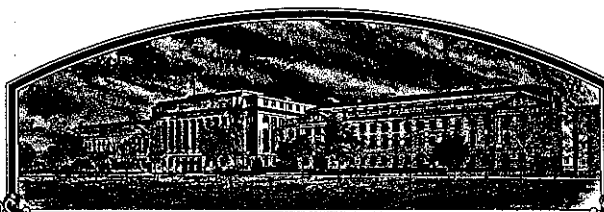


No.

8100015



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Northrup King Co.

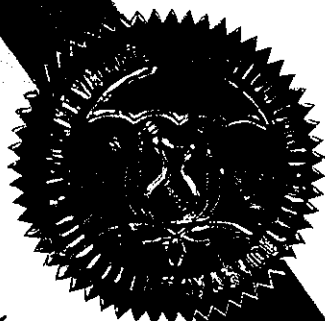
Whereas, THERE HAS BEEN PRESENTED TO THE
Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (T. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

BARLEY

'401'



In Testimony Whereof, I have hereunto set
my hand and caused the seal of the Plant
Variety Protection Office to be affixed
at the City of Washington
this 22nd day of February in
the year of our Lord one thousand nine
hundred and eighty-five.

Attest:

Kenneth H. ...
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

John R. Block
Secretary of Agriculture

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION

FORM APPROVED
OMB NO. 40-R3822

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: See Reverse.

No certificate for plant variety protection may be issued unless a completed application form has been received (5 U.S.C. 553).

1a. TEMPORARY DESIGNATION OF VARIETY Experimental 214-W		1b. VARIETY NAME Variety 401		FOR OFFICIAL USE ONLY PV NUMBER 8100015	
2. KIND NAME Barley		3. GENUS AND SPECIES NAME Hordeum vulgare L.		FILING DATE 11/10/80	TIME 12:30 P.M.
4. FAMILY NAME (BOTANICAL) Gramineae		5. DATE OF DETERMINATION October 1977		FEE RECEIVED \$ 500.00 \$ 250.00	DATE 11/10/80 2/11/85
6. NAME OF APPLICANT(S) Northrup King Co.		7. ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code) 1500 Jackson St. N.E. Minneapolis, MN 55413		8. TELEPHONE AREA CODE AND NUMBER 612-781-8011	
9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: (Corporation, partnership, association, etc.) Corporation		10. IF INCORPORATED, GIVE STATE AND DATE OF INCORPORATION Delaware		11. DATE OF INCORPORATION 1896	
12. NAME AND MAILING ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS: P.O. Box 959, Minneapolis, MN 55440 Robert W. Romig, Northrup King Co., 1500 Jackson St. N.E., Minneapolis, MN 55413					

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

- ☒ 13A. Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)
- ☒ 13B. Exhibit B, Novelty Statement.
- ☒ 13C. Exhibit C, Objective Description of the Variety (Request form from Plant Variety Protection Office.)
- ☒ 13D. Exhibit D, Additional Description of the Variety.

14a. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a). (If "Yes," answer 14B and 14C below.)		<input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> NO <i>and 12/4/80 as per telephone call.</i>	
14b. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	14c. IF "YES," TO 14B, HOW MANY GENERATIONS OF PRODUCTION BEYOND BREEDER SEED? <input checked="" type="checkbox"/> FOUNDATION <input checked="" type="checkbox"/> REGISTERED <input checked="" type="checkbox"/> CERTIFIED		
15a. DID THE APPLICANT(S) FILE FOR PROTECTION OF THIS VARIETY IN OTHER COUNTRIES? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO (If "Yes," give name of countries and dates.)			
15b. HAVE RIGHTS BEEN GRANTED THIS VARIETY IN OTHER COUNTRIES? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO (If "Yes," give name of countries and dates.)			

16. DOES THE APPLICANT(S) AGREE TO THE PUBLICATION OF HIS/HER (THEIR) NAME(S) AND ADDRESS IN THE OFFICIAL JOURNAL? ☒ YES ☐ NO

17. The applicant(s) declare(s) that a viable sample of basic seed of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

November 5, 1980
(DATE)

Robert W. Romig
(SIGNATURE OF APPLICANT)

(DATE)

(SIGNATURE OF APPLICANT)

INSTRUCTIONS

GENERAL: Send an original copy of the application and exhibits, at least 2,500 viable seeds, and \$500 fee (\$250 filing fee and \$250 examination fee) to U.S. Dept. of Agriculture, Agricultural Marketing Service, Livestock, Poultry, Grain and Seed Division, Plant Variety Protection Office, National Agricultural Library Building, Beltsville, Maryland 20705. (See section 180.175 of the Regulations and Rules of Practice.) Retain one copy for your files. All items on the face of the form are self-explanatory unless noted below.

ITEM

- 5 Give the date the applicant determined that he had a new variety based on (1) the definition in section 41(a) of the Act and (2) the date a decision was made to increase the seed.
- 13a Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method; (2) the details of subsequent stages of selection and multiplication; (3) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified and (4) evidence of uniformity and stability.
- 13b Give a summary statement of the variety's novelty. Clearly state how this novel variety may be distinguished from all other varieties in the same crop. If the new variety most closely resembles one or a group of related varieties: (1) identify these varieties and state all differences objectively; (2) attach statistical data for characters expressed numerically and demonstrate that these differences are significant; and (3) submit, if helpful, seed and plant specimens or photographs of seed and plant comparisons clearly indicating novelty.
- 13c Fill in the Exhibit C, Objective Description form, for all characteristics for which you have adequate data.
- 13d Describe any additional characteristics that are not described, or whose description cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the description of characteristics that are difficult to describe, such as, plant habit, plant color, disease resistance, etc.
- 14a If "YES" is specified (seed of this variety be sold by variety name only as a class of certified seed) the applicant may NOT reverse his affirmative decision after the variety has either been sold and so labeled, his decision published, or the certificate has been issued. However, if the applicant specified "NO," he may change his choice. (See section 180.16 of the Regulations and Rules of Practice.)
- 15a See section 42 of the Plant Variety Protection Act and section 180.7 of the Regulations and Rules of Practice.

Exhibit A**Origin and Breeding History of Variety 401 (Experimental 214-W)**

Variety 401, previously designated as experimental 214-W, originated at Woodland, California from a cross made in 1969 of Minnesota selection 64-98-8 with the cultivar "Numar." The Minnesota selection is a breeding line developed at the University of Minnesota which possesses short, stiff straw. Numar is a varietal release from the California Agricultural Experiment Station.

The cross was made in the field and the resultant F1 seed was grown as a bulk at Salinas, California in the summer of 1969. The F2 generation was grown at Woodland in the 1969-70 season, and the F3 generation at Salinas in 1970. During these periods of generation advance, Pedigree, individual plant selection was followed. In 1970 a single plant selection made in the F3 generation was crossed to the cultivar "CM 67." CM 67 is a barley yellow dwarf tolerant varietal release from the California Agricultural Experiment Station. In an identical manner as described above, Pedigree, individual plant selection was practiced until 1972, at which time an F4 progeny line derived from an individual F3 plant selection was bulk harvested.

A seed purification program was initiated in 1973 by growing 20 F5 head rows derived from head samples taken from the previous (F4) generation. On the basis of uniformity, genetic purity and desirability of agronomic type, 10 individual head rows were harvested separately at Salinas and grown in individual plots at Woodland in 1974. The bulk of these 10 lines was selected to represent the experimental barley line 214, later to be named Kombyne.

In 1976, the variety 401, previously noted as experimental 214-W, was created by selecting and bulking 1 head from each of 100 homozygous white aleurone plants from Breeder seed of the variety Kombyne.

Any further Breeder seed increases will be made using seed from this white aleurone seed lot.

We feel this reselection within the variety Kombyne has created a variety similar in all respects to the variety Kombyne except that Variety 401 is uniform for the white aleurone trait. Our observations and experiences during the multiplication and increase of Variety 401 gives every indication that this is a uniform and stable variety.

The genealogy of Variety 401 is: Minnesota 64-98-8/Numar//CM 67.

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Exhibit B (Amended)

Novelty Statement for 401 Barley

Barley variety "401" is most similar to "CM 67" but differs in that the lemma awns are semi-smooth whereas those of "CM 67" are rough.

OBJECTIVE DESCRIPTION OF VARIETY
BARLEY (HORDEUM VULGARE)

INSTRUCTIONS: See Reverse.

NAME OF APPLICANT(S)

Northrup King Co.

ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)

1500 Jackson St. N.E., Minneapolis, MN 55413

FOR OFFICIAL USE ONLY

PVPO NUMBER

8100015

VARIETY NAME OR TEMPORARY
DESIGNATION

Variety 401

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (i.e. or) when number is either 99 or less or 9 or less.

1. GROWTH HABIT:

 1 = SPRING 2 = FACULTATIVE WINTER 3 = WINTER Early Growth: 1 = PROSTRATE 2 = SEMIPROSTRATE
3 = ERECT

2. MATURITY (50% Flowering):

 1 = EARLY (California Mariout) 2 = MIDSEASON (Betzes) 3 = LATE (Frontier) No. of days Earlier than 1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON No. of days Later than 5 = PIROLINE 6 = PRIMUS 7 = UNITAN 8 = KOMBYNE EN 4/20/82

3. PLANT HEIGHT (From soil level to top of head):

 1 = SEMIDWARF 2 = SHORT (California Mariout) 3 = MEDIUM TALL (Betzes) 4 = TALL (Conquest) Cm. Shorter than 1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON Cm. Taller than 5 = PIROLINE 6 = PRIMUS 7 = UNITAN 8 = KOMBYNE EN 4/20/82

4. STEM:

 Exertion (Flag to spike at maturity): 1 = 0 - 3 cm. 2 = 3 - 10 cm. Anthocyanin: 1 = ABSENT 2 = PRESENT
3 = 10 - 15 cm. NO. OF NODES (Originating from node above ground) Collar Shape: 1 = CLOSED 2 = V-SHAPED 3 = OPEN Shape of Neck: 1 = STRAIGHT 2 = SNAKY
4 = MODIFIED CLOSED OR OPEN 3 = OTHER (Specify)

5. LEAF:

 Basal leaf sheath (seedling): 1 = GLABROUS 2 = PUBESCENT Position of flag leaf (at boot stage): 1 = DROOPING
2 = UPRIGHT Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY
3 = WAXY CM. LENGTH (First leaf below flag leaf) MM. WIDTH (First leaf below flag leaf) Anthocyanin in leaf sheath: 1 = ABSENT 2 = PRESENT

6. HEAD:

 Type: 1 = TWO-ROWED 2 = SIX-ROWED Density: 1 = LAX 2 = ERECT (Not dense)
3 = ERECT (Dense) Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY
4 = OTHER (Specify) 3 = WAXY Lateral Kernels Overlap: 1 = NONE 2 = AT TIP Rachis (Hair on edge): 1 = LACKING 2 = FEW 3 = COVERED
3 = 1/4 - 1/2 OF HEAD

7. GLUME:

 Length: 1 = 1/3 OF LEMMA 2 = 1/2 OF LEMMA Hairs: 1 = NONE 2 = SHORT 3 = LONG
3 = MORE THAN 1/2 OF LEMMA Hair covering: 1 = NONE 2 = RESTRICTED TO MIDDLE 3 = CONFINED TO BAND 4 = COMPLETELY COVERED Awns: 1 = LESS THAN EQUAL TO LENGTH OF GLUMES 2 = EQUAL TO LENGTH OF GLUMES
3 = MORE THAN EQUAL TO LENGTH OF GLUMES Awn Surface: 1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH

8. LEMMA:

- ☐ 5 Awn: 1 = AWNLESS 2 = AWNLETS ON CENTRAL ROWS AWNLESS ON LATERAL ROWS
 3 = SHORT ON CENTRAL ROWS, AWNLETS ON LATERAL ROWS 4 = SHORT (less than equal to length of spike)
 5 = LONG (longer than spike) 6 = HOODED
- ☐ 2 Awn Surface: ~~0~~ = AWNLESS ~~1~~ = SMOOTH ~~2~~ = SEMISMOOTH ~~3~~ = ROUGH *205 4/28/82 = SEMISMOOTH*
- ☐ 2 Teeth: 1 = ABSENT 2 = FEW 3 = NUMEROUS ☐ 2 Hair: 1 = ABSENT 2 = PRESENT
- ☐ 3 Shape of base: 1 = DEPRESSION 2 = SLIGHT CREASE ☐ 2 Rachilla Hairs: 1 = SHORT 2 = LONG
 3 = TRANSVERSE CREASE

9. STIGMA:

- ☐ 2 Hairs: 1 = FEW 2 = MANY

10. SEED:

- ☐ 2 Type: 1 = NAKED 2 = COVERED ☒ 2 Hairs on Ventral Furrow: 1 = ABSENT 2 = PRESENT *Est as per letter dated 1/2/85*
- ☐ 4 Length: 1 = SHORT (8.0 mm.) 2 = SHORT TO MIDLONG (7.5 - 9.0 mm.) 3 = MIDLONG (8.5 - 9.5 mm.)
 4 = MIDLONG TO LONG (9.0 - 10.5 mm.) 5 = LONG (10.0 mm.)
- ☐ 2 Wrinkling of hull: 1 = NAKED 2 = SLIGHTLY WRINKLED 3 = SEMIWRINKLED 4 = WRINKLED
- ☐ 1 Aleurone Color: 1 = COLORLESS (White or Yellow) 2 = BLUE
- ☐ PERCENT ABORTIVE ☐ 5 ☐ 2 GMS. PER 1000 SEEDS

11. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

- | | | | |
|---------------------------------------|---|---|---|
| <input type="checkbox"/> 0 SEPTORIA | <input type="checkbox"/> 1 NET BLOTCH | <input type="checkbox"/> 0 SPOT BLOTCH | <input type="checkbox"/> 1 POWDERY MILDEW |
| <input type="checkbox"/> 0 LOOSE SMUT | <input type="checkbox"/> 1 BACTERIAL BLIGHT | <input type="checkbox"/> 0 COVERED SMUT | <input type="checkbox"/> 0 FALSE LOOSE SMUT |
| <input type="checkbox"/> 1 STEM RUST | <input type="checkbox"/> 0 LEAF RUST | <input type="checkbox"/> 0 SCAB | <input type="checkbox"/> 1 SCALD ? |
| <input type="checkbox"/> 0 AY | <input type="checkbox"/> 0 BSMV | <input type="checkbox"/> 2 BYDV | <input type="checkbox"/> 0 OTHER (Specify) |

12. INSECT: (0 = Not tested, 1 = Susceptible 2 = Resistant)

- | | | | |
|--|--|--|-------------------------------------|
| <input type="checkbox"/> 0 GREEN BUG | <input type="checkbox"/> 0 ENGLISH GRAIN APHID | <input type="checkbox"/> 0 CHINCH BUG | <input type="checkbox"/> 0 ARMYWORM |
| <input type="checkbox"/> 0 GRASS HOPPERS | <input type="checkbox"/> 0 CERIAL LEAF BETTLE | <input type="checkbox"/> 0 OTHER (Specify) | |
| HESSIAN FLY RACES | | <input type="checkbox"/> 0 GP | <input type="checkbox"/> 0 A |
| | | <input type="checkbox"/> 0 B | <input type="checkbox"/> 0 C |
| | | <input type="checkbox"/> 0 D | <input type="checkbox"/> 0 E |
| | | <input type="checkbox"/> 0 F | <input type="checkbox"/> 0 G |

13. CHEMICAL (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

- ☐ DDT ☐ OTHER (Specify)

14. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Kombyne	Seed size	Kombyne
Leaf size	Kombyne	Coleoptile elongation	Kombyne
Leaf color	Kombyne	Seedling pigmentation	Kombyne
Leaf carriage	Kombyne		

REFERENCES: The following publications may be used as a reference aid for the standardization of character descriptions and terms used in this form:

1. Wiebe, G. A., and D. A. Reid, 1961, Classification of Barley Varieties Grown in the United States and Canada in 1958, Technical Bulletin No. 1224, U.S. Dept. of Agriculture.
2. Reid, D. A., and G. A. Wiebe, 1968, Barley: Origin, Botany, Culture, Winter Hardiness, Genetics, Utilization, Pests, Agriculture Handbook No. 338, U.S. Dept. of Agriculture. pp. 61 - 84.
3. Malting Barley Improvement Association, Milwaukee, Wisconsin, 1971, Barley Variety Dictionary.

COLOR: Nickerson's or any recognized color fan may be used to determine color of the described variety.

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Exhibit D

Additional Description of the Variety

Variety 401 has a spring growth habit. Early vegetative growth is semi-prostrate. It has a 6 row head which is lax, mid long, erect to inclined and the rachis edges are long haired. The lemma awns are long and semi-smooth. The glumes possess long hairs restricted to the middle region. The kernel has an adhering and slightly wrinkled hull. The aleurone color is white.

Variety 401 is short in height and midseason in maturity, being approximately 5 cm shorter and 6 days later than CM 67. It is also very tolerant to the barley yellow dwarf virus as is CM 67 and Kombyne.

Variety 401 is well adapted to the irrigated barley areas of Arizona and California.

Table 1. Date of Heading Comparisons of Variety 401, Kombyne and CM 67

<u>Location and Year</u>	<u>Variety</u>		
	<u>Variety 401</u>	<u>Kombyne</u>	<u>CM 67</u>
Woodland, Calif.			
1977	April 8	April 8	March 31
1978	April 4	April 4	March 27
Yuma, Arizona			
1977	March 10	March 10	April 30
1978	March 7	March 6	April 25

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Table 2. Height Comparisons of Variety 401, Kombyne and CM 67

<u>Location and Year</u>	<u>Variety</u>		
	<u>Variety 401</u>	<u>Kombyne</u>	<u>CM 67</u>
Woodland, Calif.			
1977	81	80	88
1978	84	84	90
Yuma, Arizona			
1977	78	78	83
1978	82	84	91

Table 3. Comparison of Variety 401, Kombyne and CM 67 for Lodging^{1/}

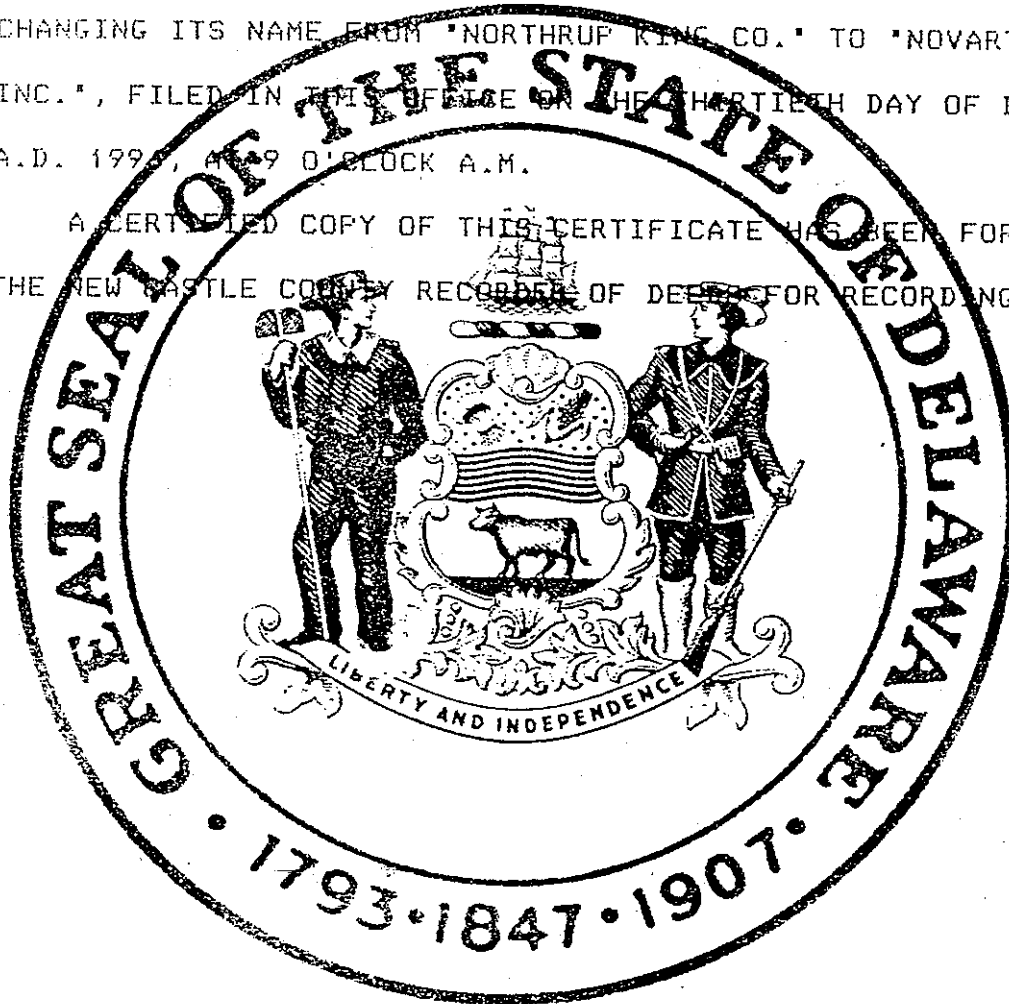
<u>Location and Year</u>	<u>Variety</u>		
	<u>Variety 401</u>	<u>Kombyne</u>	<u>CM 67</u>
Woodland, Calif.			
1977	1	2	5
1978	1	1	5
Yuma, Arizona			
1977	1	1	5
1978	2	2	5

^{1/}Scale of 1-5: 1 = erect and 5 = flat

Office of the Secretary of State

I, EDWARD J. FREEL, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THE ATTACHED IS A TRUE AND CORRECT COPY OF THE CERTIFICATE OF AMENDMENT OF "NORTHROP KING CO.", CHANGING ITS NAME FROM "NORTHROP KING CO." TO "NOVARTIS SEEDS, INC.", FILED IN THIS OFFICE ON THE THIRTIETH DAY OF DECEMBER, A.D. 1995, AT 9 O'CLOCK A.M.

A CERTIFIED COPY OF THIS CERTIFICATE HAS BEEN FORWARDED TO THE NEW CASTLE COUNTY RECORDS OF DEEDS FOR RECORDING.



Edward J. Freel

Edward J. Freel, Secretary of State

0829320 8100

960389892

AUTHENTICATION:

8267947

DATE:

12-31-96

CERTIFICATE OF AMENDMENT OF CERTIFICATE OF INCORPORATION
OF
NORTHROP KING CO.

It is certified that:

1. The name of the corporation (hereinafter called the "Corporation") is Northrup King Co.

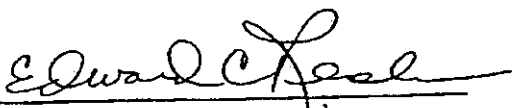
2. The Certificate of Incorporation of the Corporation is hereby amended by striking out Section 1 thereof and by substituting in lieu of said Section the following new Section.

1. The name of the Corporation is Novartis Seeds, Inc.

3. The amendment of the certificate of incorporation herein certified has been duly adopted and written consent has been given in accordance with the provisions of Sections 228 and 242 of the General Corporation Law of the State of Delaware.

4. The effective date of the amendment herein certified shall be January 1, 1997.

Signed on December 27, 1996.


Edward C. Resler
Vice President & Secretary